Remarks

Claims 1-22 are pending. With this response, claims 6 and 7 are amended; claims 23-25 are added; and claims 14-23 have been canceled. Claims 6 and 7 have been rewritten in independent format, and support for claims 23-25 is found at page 9, line 7-page 10, line 8. No new matter has been added. Reconsideration of the claims, in view of the remarks that follow, is respectfully requested.

I. Rejection of the claims for indefiniteness.

Claims 1-13 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failure to particularly point out and distinctly claim the subject matter applicant regards as the invention. The claims are deemed confusing due to the use of the term "amide." The Office Action considers the listed ligand structure to correspond to an "amine." Applicants respectfully traverse the rejection.

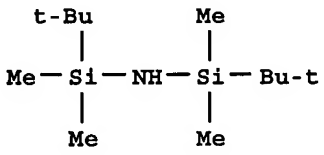
Many equally appropriate systems are used for naming chemical compounds. In the current specification and claims, applicants have chosen to identify the ligand as an "amide," which is a known and accepted naming system for the subject compounds. See for example Exhibit A, which is the Chemical Abstract for Compound Registry No. 4039-32-1. The Chemical Abstract name for the compound is ***silanamine, 111-trimethyl, N-(trimethylsilyl)-, lithium salt***, i.e., the compound is identified as an amine. However, an equally appropriate alternative name for the same compound is ***lithium bis(trimethylsilyl)amide***, i.e., the compound is identified as an amide. Applicants submit that the word "amide" as it is used in the specification and claims of the instant application is clear and definite. The rejection may be withdrawn.

II. Anticipation of the claims over Derwent Accession Number 113:78097.

Claims 1-6, 9 and 12-13 stand rejected as anticipated by Derwent Publication Ltd. Accession Number 113:78097 ("Chupp Abstract"). The reference is an abstract taken from a J.P. Chupp et al. article in *J. Heterocyclic Chemistry* (1989), 26(6), pages 1771-1780 ("Chupp Article"). A copy of the Chupp Article is included with this response and is submitted in a Form PTO 1449 accompanying this Response.

Neither the Chupp Abstract nor the Chupp Article teaches or suggests the claimed invention.

The Chupp Abstract identifies a compound by the name of ***silaneamine, 1-1,1-dimethylethyl)-N-[(1,1-dimethylethyl)dimethylsilyl]-1,1-dimethyl-, sodium salt***, having the chemical formula:



The Chupp Abstract also identifies sodium bis(trimethylsilyl)amide, $NaN(SiMe_3)_2$, which is a solid and therefore does not anticipate the claimed invention. See, Exhibit B discussing the crystal structure of $NaN(SiMe_3)_2$.

Applicants have carefully reviewed the Chupp Article and have found no mention of either of these two compounds. The Chupp Article in passing mentions lithium

bis(trimethylsilyl)amide; however, this compound also is a solid and does not anticipate the claimed invention. See, Exhibit C discussing the crystal structure of $LiN(SiMe_3)_2$.

Neither the Chupp Abstract nor the Chupp Article provide a disclosure of the compound of ***silaneamine, 1-1,1-dimethylethyl)-N-[(1,1-dimethylethyl)dimethylsilyl]-1,1-dimethyl-, sodium salt***. The Chupp Abstract names the compound and refers to the Chupp Article for further disclosure. The Chupp Article, however, does not disclose the compound, either by name or structure. One simply must conclude that the inclusion of this compound in the Chupp Abstract occurred in error. For example, no data relating to the compound such as melting point or vapor pressure are reported in either the abstract or the corresponding journal[1]. There are no spectra or molecular structures or crystal structures given. There is no elemental analysis published for this compound. Nor is a method of making the compound disclosed.

Even if the Chupp Abstract were a disclosure of the compound named in the document, the molecular formula and structure of the compound differ from compounds of the instant invention. The Chupp Abstract discloses a neutral amine associated with a sodium atom. The amide ligands of claims 2-11 lack the amino proton of the prior art compound.

In addition, the Chupp Abstract discloses a "sodium salt," which is not expected to be a liquid near room temperature. Having failed to even establish the existence of the compound, the prior art certainly cannot have disclosed a sodium salt having surprising physical properties, namely, that it is a liquid "at a temperature of less than about 70°C" as is recited in claim 13, "at a temperature of 20°C" as recited in claim 1, or "has a viscosity at 40°C in the range of about 200-1000 cP" as recited in claim 12.

[1] A careful search of the chemical literature using Chemical Abstracts conducted by Dr. Roy Gordon, one of the inventors, did not reveal any further data regarding this compound.

In particular, there is no disclosure of an alkali metal amide compound having the structure recited in claim 6.

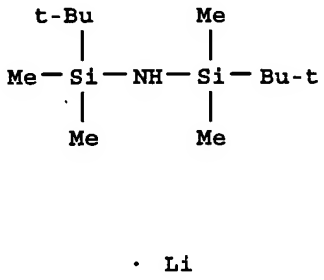
For the foregoing reasons, the Chupp Abstract and the Chupp Article do not anticipate any of claims 1-13.

III. Rejection of the claims over Derwent Accession Number 107:96786.

Claims 1-6, 8 and 12-13 stand rejected as anticipated by Derwent Publication Ltd. Accession Number 107:96786 ("Nieke Abstract"). The reference is an abstract taken from a Nieke et al. article in *Chimia* (1986), 40(6), pages 202-205 ("Nieke Article"). A copy of the Nieke Article is included with this response, and is submitted in a Form PTO 1449 accompanying this Response.

Neither the Nieke Abstract nor the Nieke Article teaches or suggests the claimed invention.

The Nieke Abstract identifies a compound by the name of ***silaneamine, 1-1,1-dimethylethyl)-N-[(1,1-dimethylethyl)dimethylsilyl]-1,1-dimethyl-, lithium salt***, having the chemical formula:



Applicants have carefully reviewed the Nieke Article and have found no mention of the above compound. The information provided in the Nieke Abstract and the Nieke Article do not

constitute a disclosure of the compound. Both the Nieke Abstract and the Nieke Article fail to disclose any data relating to the existence or properties of this lithium salt. No method for its synthesis is disclosed. One must again conclude that the inclusion of this compound in the Nieke Abstract occurred in error. Even if the Nieke Abstract were a disclosure of the compound named in the document, the molecular formula and structure of the compound differs from compounds of the instant invention. The Nieke Abstract discloses a neutral amine associated with a sodium atom. The amides ligands of claims 2-11 lack the amino proton of and are therefore not anticipated by the Nieke Abstract.

The Nieke Article discloses $LiN(SiMe_3)R'$, where R' is $SiMe_3$, $SiMe_2tBu$, CH_2tBu, 1-adamantyl, 2,4,6-$tBu_3C_6H_2$and 2,4,6-$Me_3C_6H_2$. See Scheme I of the Nieke Article at page 203. However, there is no teaching or suggestion in the Nieke Article of a lithium amide compound that is a liquid at "a temperature of less than about 70°C," or "at a temperature of 20°C", as is recited in claims 13 and 1, respectively. Lithium bis(trimethylsilyl)amide, ($LiN(SiMe_3)R'$, where R' is $SiMe_3$) is a solid (Exhibit C). None of the other lithium amides shown in Scheme I of the Nieke Article has ever been reported as isolated in the pure state, so their status as solids or liquids are unknown to this day.[2] The Nieke Article does not disclose the preparation or isolation of any of the compounds. In fact no physical properties are reported, such as melting point or vapor pressure that would inform a reader of the physical state of the compounds. No elemental analyses or structural or spectroscopic characterizations have been reported for any of these other lithium amides. There is simply no evidence, explicit or inherent, that these compound possess the limitations of the instant claims.

[2] A careful search of the chemical literature using Chemical Abstracts conducted by the inventor for lithium bis(t-butyldimethylsilyl)amide and for the trimethylsilyl amide compounds disclosed in Scheme I of the Nieke Article did not reveal any further data regarding these compounds.

Furthermore, the expectation in the art is that a lithium salt is a solid at room temperature and thus the art skilled reader has no reason to expect that the disclosed compound are a liquid "at a temperature of less than about 70°C" as is recited in claim 13, "at a temperature of 20°C" as recited in claim 1, or have "a viscosity at 40°C in the range of about 200-1000 cP" as recited in claim 12.

In particular, there is no disclosure of an alkali metal amide compound having the structure recited in claim 6.

For the foregoing reasons, the Nieke Abstract and the Nieke Article do not anticipate any of claims 1-13.

IV. Obviousness rejection.

Claims 7 and 10-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Chupp Abstract or the Nieke Abstract. While acknowledging that there is no disclosure in the prior art of the features recited in claims 7, 10 and 11, the Office Action asserts that these features would nonetheless have been obvious because the references broadly disclose the production and use of silanamines. See Paragraph 9 of Office Action dated 17, 2004 at page 4. Applicants respectfully disagree.

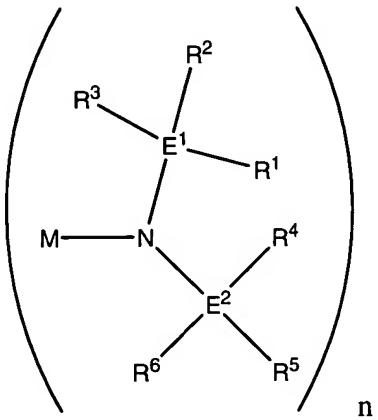
The Chupp and Nieke Abstracts and related Chupp and Nieke Articles do not teach or suggest the claimed compositions. Firstly, none of the references discloses the production of any silanamine compound. Secondly, the references narrowly describe the use of the disclosed silanamines as bases in an organic reaction. There is nothing about their use as a base that suggests the desirability of an alkali metal amide compound that is a liquid at "a temperature of less than about 70°C" or at "a temperature of 20°C,"as is recited in claims 13 and 1, respectively.

Most certainly, there is no teaching or suggestion of the specific compounds recited in claims 6, 7 and 11. These compounds have been made, tested and demonstrated to be liquids at 20°C. As noted in the instant specification, such volatile compounds are useful as precursors in the vapor deposition of films that contain an alkali metal. There is no guidance or suggestion in any of the prior art references directed to the use of a basic trimethylsilyl amide in organic synthesis to prepare an alkali metal amide that is a liquid at room temperature, much less to prepare the specific compounds recited in claims 6, 7 and 11. Claims 6 and 7 are rewritten as independent claims and are in condition for allowance.

For the foregoing reasons, the Chupp Abstract and the Nieke Abstract (and related articles) do not render any of claims 1-13 obvious.

V. Additional claims.

Claims 23-25 are newly added and are directed to a liquid alkali metal amide compound having the formula



where M is an alkali metal; E^1 and E^2 may be the same or different and are tetravalent atoms selected from the group consisting of carbon, silicon, germanium or tin, and R^1, R^2, R^3, R^4, R^5 and R^6 may be the same or different and are selected from the group consisting of hydrogen, alkyl groups, fluoroalkyl groups or alkyl groups substituted by other atoms or groups,

wherein at least one of R^1, R^2, R^3, R^4, R^5 and R^6 contains more than one carbon atom, and wherein one or more carbons may be replaced by an isoelectronic species, and n is a number equal to or greater than one, and wherein the number of angular variables of the amide in excess of those present in the reference compound bis(trimethylsilyl)amine is two or more.

Because there is no evidence for the existence of the compound named in each of the Chupp and Nieke Abstracts and because there is no method disclosed in the Abstracts for making the compounds, it is submitted that the references do not teach or suggest the named compounds.

Furthermore, all of the compounds disclosed in the Chupp Article and the Nieke Article have angular variable numbers in excess of the reference compound that are less than two. Thus, the Chupp Article and the Nieke Article do not anticipate claims 23-25. In addition, there is no guidance or suggestion in these references to prepare a liquid alkali metal amide that has a "number of angular variables of the amide in excess of those present in the reference compound bis(trimethylsilyl)amine [of] two or more," as is recited in claim 23.

For the foregoing reasons, the Chupp Abstract and the Nieke Abstract (and related articles) do not render any of claims 23-25 obvious.

Please charge any underpayments or credit any overpayments to our Deposit Account No. 08-0219. If there are any questions, please call the undersigned at the telephone number indicated below.

Respectfully submitted,

Date: September 17, 2004

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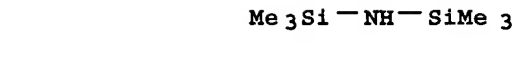
Registry Number: 4039-32-1



Formula: C6 H19 N Si2 . Li

CA Index Name: Silanamine, 1,1,1-trimethyl-N-(trimethylsilyl)-, lithium salt (9CI)

Other Names: Disilazane, 1,1,1,3,3,3-hexamethyl-, Li deriv. (6CI); Disilazane, 1,1,1,3,3,3-hexamethyl-, lithium salt (8CI); Lithium, [bis(trimethylsilyl)amino]- (7CI); (Hexamethyldisilazane)lithium; 1,1,1,3,3,3-Hexamethyldisilazane lithium salt; 1,1,1-Trimethyl-N-(trimethylsilyl)silanamine lithium salt; Bis(trimethylsilyl)amidolithium; Hexamethyldisilazane lithium salt; Lithiobis(trimethylsilyl)amide; Lithiohexamethyldisilazane; Lithium bis(trimethylsilyl)amide; Lithium bis(trimethylsilyl)amine; Lithium hexamethyldisilazanate; Lithium hexamethyldisilazane; Lithium hexamethyldisilazanide; Lithium hexamethyldisilazide; N-Lithiohexamethyldisilazane; [1,1,1-Trimethyl-N-(trimethylsilyl)silanaminato]lithium

-- Resources --

References: ~925

STN Files: CAPLUS, BEILSTEIN, BIOBUSINESS, BIOSIS, CA, CAOLD, CASREACT, CEN, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHEM, GMELIN, IFICDB, IFIPAT, IFIUDB, MSDS-OHS, PROMT, TOXCENTER, USPAT2, USPATFULL

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Deleted Registry Number(s): 66568-21-6, 68092-53-5, 97462-05-0, 166307-01-3, 170947-20-3, 330660-50-9, 552321-61-6, 618461-92-0

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Regulated Chemicals Listing
Reaction Information

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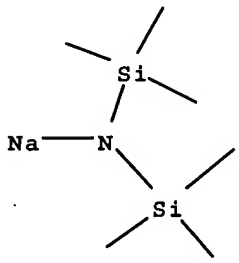

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Bibliographic Information

The crystal structure of N-sodiohexamethyldisilazane, Na[N{Si(CH3)3}2]. Gruening, Rainer; Atwood, Jerry L. Dep. Chem., Univ. Alabama, University, AL, USA. Journal of Organometallic Chemistry (1977), 137(1), 101-11. CODEN: JORCAI ISSN: 0022-328X. Journal written in English. CAN 87:151632 AN 1977:551632 CAPLUS (Copyright 2004 ACS on SciFinder (R))

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Bibliographic Information

Association of bis(trimethylsilyl)amidolithium and methyl(trimethylsilanolato)beryllium in the solid state. Mootz, Dietrich; Zinnius, A.; Boettcher, B. Tech. Univ. Braunschweig, Brunswick, Fed. Rep. Ger. Angewandte Chemie, International Edition in English (1969), 8(5), 378-9. CODEN: ACIEAY ISSN: 0570-0833. Journal written in English. CAN 71:25478 AN 1969:425478 CAPLUS (Copyright 2004 ACS on SciFinder (R))

Abstract

X-ray structure anal. showed that (Me3Si)2NLi crystallizes from petroleum ether in a trimer having a cyclo structure. Similarly Me3SiOBeMe crystallizes in a tetramer having a close structure. In cyclo-tris[bis(trimethylsilyl)-amidolithium, [(Me3Si)2NLi]3, the assocn. consists of 3 crystallographic independent monomers forming a planar 6-membered ring with alternating N and Li atoms; the crystals belong to the space group P21/c. closo-Tetrakismethyl(trimethylsilanolato)-beryllium], [Me3SiOBeMe]4 has a structure analogous to that of cubane; the O and Be atoms lie at alternative vertexes of a slightly distorted cube; the O-Si and Be-C bonds lie on outward prolongations of the diagonals of the cube; a symmetry axis of the space group passes through the middle of the mol., and the crystals belong to the space group C2/c.